Overview on governance structures in bwHPC

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In Baden-Württemberg, the implementation of the bwHPC concept has created efficient, distributed research infrastructures involving scientists, grant giving organizations and HPC operators at various sites. To ensure the operation of HPC resources in a successful, efficient and fair way for all involved parties, several governance structures were created and further developed. The ALWR-BW and the bwHPC-Lenkungskreis ("steering committee") are the superordinate structures for decisions concerning the bwHPC strategy. They rely on subordinate governance structures, such as the bwHPC-C5 Kernteam ("core team"), the bwHPC-C5 CAT ("cluster selection team") and the bwHPC-TAB ("technical advisory board") for the actual decision making process. Scientific governance is provided by a state-wide user committee composed of Baden-Württemberg scientists. The implementation of bwHPC is an example for the federated provisioning and control of large resources across several research and teaching institutions.

1 Federated HPC cluster governance

State-wide distributed infrastructures providing HPC services require appropriate governance structures. HPC resources are used by various scientific communities for research, teaching and training. The resources are financed by different money granting organizations. In the cooperative model, the interests and goals of the various stakeholders and shareholders have to be taken into consideration and balanced against each other. To this end, advisory and decision-making committees had to be created. These committees identify and address arising questions. At the same time they implement and moderate decision making processes.

The development of these governance structures was accomplished in parallel to the technical procurement, acquisition and deployment of the HPC resources and with the involvement of all related parties. The central governance structures encompass all affected HPC resources, taking strategic decisions. Additionally, dedicated and modular governance structures were established which directly address the needs of scientific communities or specific HPC sites.[1]

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[1]See e.g. the example for the governance of the bwForCluster NEMO discussed in these proceedings.
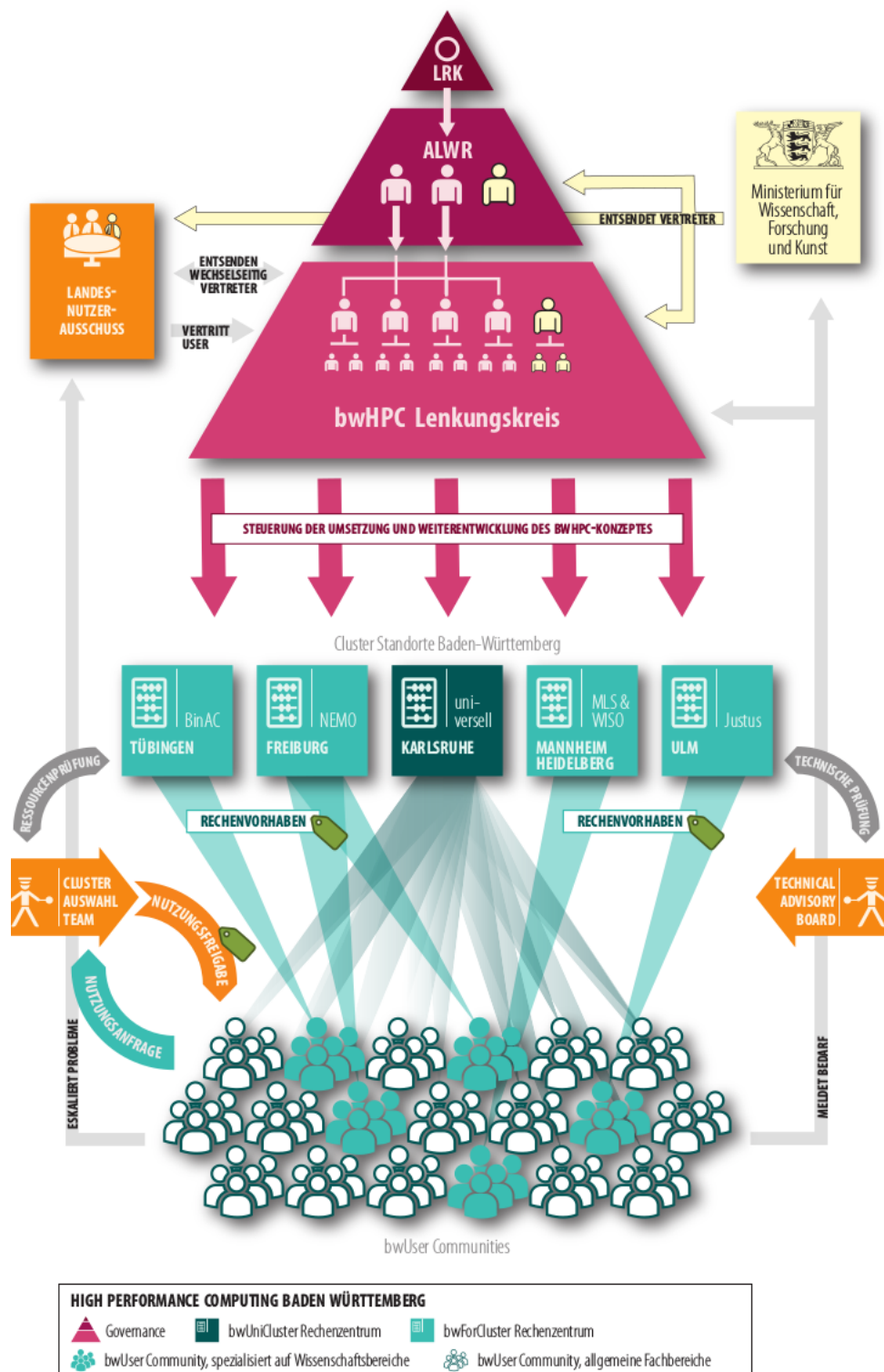
Figure 1: bwHPC governance structural overview [1].

The *ALWR-BW* and the *bwHPC-Lenkungskreis* are the superordinate governance entities of the bwHPC initiative. The *ALWR-BW* is composed of all directors of scientific computing centers at universities in the state of Baden-Württemberg. Together with representatives of the users and the *Ministry of Science, Research and the Arts Baden-Württemberg*, they form the *bwHPC-Lenkungskreis* (bwHPC steering committee). Both governance structures lay out the general policies and take strategic decisions with respect to bwHPC. Technical and administrative tasks are delegated to subordinate governance bodies, such as the bwHPC-TAB (technical advisory board), the *bwHPC-CAT (cluster selection team)* the bwHPC competence centers and the bwHPC cluster sites. In principle, as many governance decisions as possible should be taken in the subordinate bodies.

For the overall scientific governance of bwHPC, a dedicated state-wide user committee, the *Landesnutzerausschuss Baden-Württemberg (LNA-BW)* was established. For each university, a representative is suggested by the vice president of the university responsible for research. This person is then appointed by the ministry as a member of the state-wide user committee. Additionally, a representative of the ministry is invited as permanent guest to each meeting of LNA. The LNA user committee gets together at least twice per year, consolidating and moderating the manifold of HPC user expectations. It advises the ALWR-BW and the bwHPC-Lenkungskreis on their decisions and sends a representative to the steering committee. For organizational purposes, there is an LNA office which is located at the Karlsruhe Institute of Technology.

The *bwHPC-C5-Kernteam* (core team) represents the steering committee of the *bwHPC-C5 project*, which bundles HPC support activities through its bwHPC competence centers. It is composed of the bwHPC-C5 project leaders, the bwHPC-C5 work package responsibles and representatives of the HPC cluster sites. Additional members can be invited as permanent guests by way of a majority vote. The core team is responsible for the coordination of the activities of the bwHPC competence centers and development of the federated HPC solutions. Furthermore, the core team monitors the deployed infrastructure mechanisms to provide risk assessment and quality assurance. It regularly reports to LNA, bwHPC-Lenkungskreis and ALWR-BW.

The *bwHPC-C5 Clusterauswahlteam* (CAT, cluster selection team) is the governance body which takes care of directing the users to the HPC resources best suited for them. In the federate setting of bwHPC, users are not limited to HPC resources at their home university. In fact, it is often the case that the HPC competence center and the HPC resources for a specific scientific fields are concentrated at another site. The procedure to apply for bwHPC resources is designed to be lightweight in that the application is done via a simple web form and there is no in-depth scientific review. Instead, mainly a routing decision is taken by the cluster selection team. The cluster selection team is composed of two representatives of each bwHPC competence center and experts from the scientific fields.

The *bwHPC-TAB* is a state-wide committee to assure a technical and operational common ground for bwHPC resources. It reports to the superordinate governance bodies and prepares strategic decisions on operational parameters by evaluating existing alternatives, e.g. for the standard operating system or the standard scheduler used in the HPC systems. While still allowing individual solutions (where appropriate) this offers a uniform user experience on either of the distributed HPC resources.

2 Conclusions and future development

Starting from the initial bwHPC initiative proposition, foremost individual and university-bound HPC resources have been turned into state-wide service providing infrastructures for their respective scientific communities. To make this mode of operation sustainable, the governance entities that have been created and deployed constitute an indispensable component. However, the development of governance structures in the bwHPC project cannot be considered concluded. While the tasks of several committees (e.g. the bwHPC-Lenkungskreis) have been well defined, some other structures are still in the process of adapting to the demands of shareholders and stakeholders. Due to the multitude of interested parties involved on various levels, the overall structure is at first sight not as transparent as one might wish for. However, this is subject to further optimizations, incorporating all experience and feedback acquired so far.

References

[1] Wesner, S., Walter, T., Wiebelt, B., von Suchodoletz, D., Schneider, G. "Strukturen und Gremien einer bwHPC-Governance – Momentaufnahmen und Perspektiven." Kooperation von Rechenzentren Governance und Steuerung – Organisation, Rechtsgrundlagen, Politik, de Gruyter (2016): 315–329.